

1fw

PTO/SB/21 (02-04)

Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	10/501,268
	Filing Date	July 9, 2004
	First Named Inventor	Guillermo J. Tearney
	Art Unit	2878
	Examiner Name	Patrick J. Connolly
Total Number of Pages in This Submission	Attorney Docket Number	036290/US/2 - 475387-00017

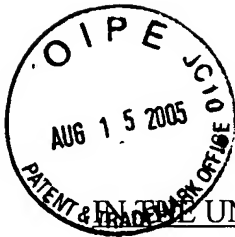
ENCLOSURES (Check all that apply)		
<input type="checkbox"/> Fee Transmittal Form	<input type="checkbox"/> Drawing(s)	<input type="checkbox"/> After Allowance communication to Technology Center (TC)
<input type="checkbox"/> Fee Attached	<input type="checkbox"/> Licensing-related Papers	<input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences
<input type="checkbox"/> Amendment/Reply	<input type="checkbox"/> Petition	<input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
<input type="checkbox"/> After Final	<input type="checkbox"/> Petition to Convert to a Provisional Application	<input type="checkbox"/> Proprietary Information
<input type="checkbox"/> Affidavits/declaration(s)	<input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address	<input type="checkbox"/> Status Letter
<input type="checkbox"/> Extension of Time Request	<input type="checkbox"/> Terminal Disclaimer	<input checked="" type="checkbox"/> Other Enclosure(s) (please identify below):
<input type="checkbox"/> Express Abandonment Request	<input type="checkbox"/> Request for Refund	PTO-1449 and Return Receipt Postcard
<input checked="" type="checkbox"/> Information Disclosure Statement	<input type="checkbox"/> CD, Number of CD(s) _____	
<input type="checkbox"/> Certified Copy of Priority Document(s)	Remarks	
<input type="checkbox"/> Response to Missing Parts/ Incomplete Application		
<input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	DORSEY & WHITNEY, LLP Gary Abelev, Esq. (Reg No. 40,479)
Signature	
Date	August 11, 2005

CERTIFICATE OF TRANSMISSION/MAILING	
I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below.	
Typed or printed name	Gary Abelev, Esq.
Signature	Date August 11, 2005

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



036290/US/2 - 475387-00017 PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s) : Guillermo J. Tearney et al.
Serial No. : 10/501,268
Filed : July 9, 2004
Entitled : APPARATUS AND METHOD FOR LOW COHERENCE
RANGING (as amended)
Group Art Unit : 2878
Examiner : Patrick J. Connolly

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

I hereby certify that this document is being sent via First Class U. S.
mail addressed to: Commissioner for Patents, P.O. Box 1450,
Alexandria, Virginia 22313-1450 on this day of August 11, 2005.

(Signature)

Dear Sir:

Pursuant to 37 C.F.R. §§ 1.56 and 1.97(b), applicants bring to the attention of the Examiner the documents listed on the attached Form PTO 1449, and respectfully request that the listed documents be considered by the Examiner and made of record in the above-captioned application. Copies of the United States patent references listed on the Form PTO-1449 are not enclosed, but the PCT, foreign and non-patent references are enclosed.

This submission does not represent that a search has been made or that no better art exists and does not constitute an admission that the listed documents are material or constitute "prior art." If the Examiner applies the documents as prior art against any claim in the application and applicants determine that the cited documents do not constitute "prior art" under

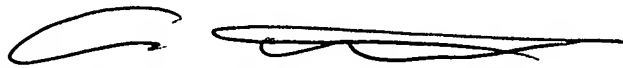
United States law, applicants reserve the right to present to the Office the relevant facts and law regarding the appropriate status of the documents.

Applicants further reserve the right to take appropriate action to establish the patentability of the disclosed invention over the listed documents, should the documents be applied against the claims of the present application.

This submission is being filed before any action by the U.S. Patent and Trademark Office on the merits. Therefore, applicants do not believe that any fee is due in connection with the submission of this paper. However, if any fee is due, or if any overpayment has been made, the Commissioner is authorized to charge any such fee or credit any overpayment, to our Deposit Account No. 50-2054.

Respectfully submitted,

DORSEY & WHITNEY, LLP



Gary Abelev
PTO Reg. No. 40,479
Attorneys for Applicants
(212) 415-9371

4829-5645-0560\1

Form PTO-1449 U.S. Department of Commerce
(REV. 2-82) Patent and Trademark Office

Atty. Docket No.
036290/US/2 - 475387-
00017

Serial No.
10/501,268

INFORMATION DISCLOSURE STATEMENT

BY APPLICANT
(Use several sheets if necessary)



Applicant(s)
Guillermo J. Tearney

Filing Date
July 9, 2004

Group
2878

U.S. PATENT DOCUMENTS

*Exam. Init.	Document No.	Date	Name	Class	Subclass	Filing Date if Appropriate
	6 6 8 5 8 8 5	February 3, 2004	Nolte et al.			
	6 6 8 7 0 0 7	February 3, 2004	Meigs			
2003	0 0 2 6 7 3 5	February 6, 2003	Nolte et al.			
2004	0 1 6 6 5 9 3	August 26, 2004	Nolte et al.			

FOREIGN PATENT DOCUMENT

Document No.	Date	Country	Class	SubClass	Translator Yes No
0 3 0 2 0 1 1 9	March 13, 2003	WIPO			

OTHER DOCUMENTS (including Author, Title Date, Pertinent Pages, Etc.)

	Nicusor V. Iftimia et al., "A Portable, Low Coherence Interferometry Based Instrument for Fine Needle Aspiration Biopsy Guidance" Accepted to Review of Scientific Instruments, 2005
	Abbas, G.L., V.W.S. Chan et al., "Local-Oscillator Excess-Noise Suppression for Homodyne and Heterodyne-Detection", <u>Optics Letters</u> , Vol. 8, pages 419-421, August 1983 issue
	Agrawal, G.P., "Population Pulsations and Nondegenerate 4-Wave Mixing in Semiconductor-Lasers and Amplifiers", <u>Journal Of The Optical Society Of America B-Optical Physics</u> , Vol. 5, pages 147-159, January 1998
	Andretzky, P. et al., "Optical Coherence Tomography by Spectral Radar: Improvement of Signal-to-Noise Ratio", <u>The International Society for Optical Engineering, USA</u> , Vol. 3915, 2000
	Ballif, J. et al., "Rapid and Scalable Scans at 21 m/s in optical Low-Coherence Reflectometry", <u>Optics Letters</u> , Vol. 22, pages 757-759, June 1997
	Barfuss H. et al., "Modified Optical Frequency-Domain Reflectometry with High Spatial-Resolution for Components of Integrated Optic Systems", <u>Journal Of Lightwave Technology</u> , Vol. 7, pages 3-10, January 1989

Examiner

Date Considered

* Examiner: Initial citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449 U.S. Department of Commerce
(REV. 2-82) Patent and Trademark Office

Atty. Docket No.
036290/US/2 – 475387-
00017

Serial No.
10/501,268

**INFORMATION DISCLOSURE STATEMENT
BY APPLICANT**
(Use several sheets if necessary)

Applicant(s)
Guillermo J. Tearney

Filing Date
July 9, 2004

Group
2878

		Beaud, P. et al., "Optical Reflectometry with Micrometer Resolution for the Investigation of Integrated Optical-Devices", <u>IEEE Journal of Quantum Electronics</u> , Vol. 25, pages 755-759, April 1989
		Bouma, Brett et al., "Power-Efficient Nonreciprocal Interferometer and Linear-Scanning Fiber-Optic Catheter for Optical Coherence Tomography", <u>Optics Letters</u> , Vol. 24, pages 531-533, April 1999
		Brinkmeyer, E. et al., "Efficient Algorithm for Non-Equidistant Interpolation of Sampled Data", <u>Electronics Letters</u> , Vol. 28, page 693, March 1992
		Brinkmeyer, E. et al., "High-Resolution OCDR in Dispersive Wave-Guides", <u>Electronics Letters</u> , Vol. 26, pages 413-414, March 1990
		Chinn, S.R. et al., "Optical Coherence Tomography Using a Frequency-Tunable Optical Source", <u>Optics Letters</u> , Vol. 22, pages 340-342, March 1997
		Danielson, B.L. et al., "Absolute Optical Ranging Using Low Coherence Interferometry", <u>Applied Optics</u> , Vol. 30, page 2975, July 1991
		Dorrer, C. et al., "Spectral Resolution and Sampling Issues in Fourier-Transform Spectral Interferometry", <u>Journal of the Optical Society of America B-Optical Physics</u> , Vol. 17, pages 1795-1802, October 2000
		Dudley, J.M. et al., "Cross-Correlation Frequency Resolved Optical Gating Analysis of Broadband Continuum Generation in Photonic Crystal Fiber: Simulations and Experiments", <u>Optics Express</u> , Vol. 10, page 1215, October 2002
		Eickhoff, W. et al., "Optical Frequency-Domain Reflectometry in Single-Mode Fiber", <u>Applied Physics Letters</u> , Vol. 39, pages 693-695, 1981
		Fercher, Adolf "Optical Coherence Tomography", <u>Journal of Biomedical Optics</u> , Vol. 1, pages 157-173, April 1996
		Ferreira, L.A. et al., "Polarization-Insensitive Fiberoptic White-Light Interferometry", <u>Optics Communications</u> , Vol. 114, pages 386-392, February 1995

Examiner

Date Considered

* Examiner: Initial citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449 U.S. Department of Commerce
(REV. 2-82) Patent and Trademark Office

Atty. Docket No.
036290/US/2 – 475387-
00017

Serial No.
10/501,268

**INFORMATION DISCLOSURE STATEMENT
BY APPLICANT**
(Use several sheets if necessary)

Applicant(s)
Guillermo J. Tearney

Filing Date
July 9, 2004

Group
2878

		Fujii, Yohji, "High-Isolation Polarization-Independent Optical Circulator", <u>Journal of Lightwave Technology</u> , Vol. 9, pages 1239-1243, October 1991
		Glance, B., "Polarization Independent Coherent Optical Receiver", <u>Journal of Lightwave Technology</u> , Vol. LT-5, page 274, February 1987
		Glombitza, U., "Coherent Frequency-Domain Reflectometry for Characterization of Single-Mode Integrated-Optical Wave-Guides", <u>Journal of Lightwave Technology</u> , Vol. 11, pages 1377-1384, August 1993
		Golubovic, B. et al., "Optical Frequency-Domain Reflectometry Using Rapid Wavelength Tuning of a Cr ⁴⁺ :Forsterite Laser", <u>Optics Letters</u> , Vol. 11, pages 1704-1706, November 1997
		Haberland, U. H. P. et al., "Chirp Optical Coherence Tomography of Layered Scattering Media", <u>Journal of Biomedical Optics</u> , Vol. 3, pages 259-266, July 1998
		Hammer, Daniel X. et al., "Spectrally Resolved White-Light Interferometry for Measurement of Ocular Dispersion", <u>Journal of the Optical Society of America A-Optics Image Science and Vision</u> , Vol. 16, pages 2092-2102, September 1999
		Harvey, K. C. et al., "External-Cavity Diode-Laser Using a Grazing-Incidence Diffraction Grating", <u>Optics Letters</u> , Vol. 16, pages 910-912, June 1991
		Hausler, Gerd et al., " 'Coherence Radar' and 'Spectral Radar' New Tools for Dermatological Diagnosis", <u>Journal of Biomedical Optics</u> , Vol., 3, pages 21-31, January 1998
		Hee, Michael R. et al., "Polarization-Sensitive Low-Coherence Reflectometer for Birefringence Characterization and Ranging", <u>Journal of the Optical Society of America B (Optical Physics)</u> , Vol. 9, page 903-908, June 1992
		Hotate Kazuo et al., "Optical Coherence Domain Reflectometry by Synthesis of Coherence Function", <u>Journal of Lightwave Technology</u> , Vol. 11, pages 1701-1710, October 1993
		Inoue, Kyo et al., "Nearly Degenerate 4-Wave-Mixing in a Traveling-Wave Semiconductor-Laser Amplifier", <u>Applied Physics Letters</u> , Vol. 51, pages 1051-1053, 1987

Examiner

Date Considered

* Examiner: Initial citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449 U.S. Department of Commerce
(REV. 2-82) Patent and Trademark Office

Atty. Docket No.
036290/US/2 – 475387-
00017

Serial No.
10/501,268

**INFORMATION DISCLOSURE STATEMENT
BY APPLICANT**
(Use several sheets if necessary)

Applicant(s)
Guillermo J. Tearney

Filing Date
July 9, 2004

Group
2878

		Ivanov, A. P. et al., "New Method for High-Range Resolution Measurements of Light Scattering in Optically Dense Inhomogeneous Media", <u>Optics Letters</u> , Vol. 1, pages 226-228, December 1977
		Ivanov, A. P. et al., "Interferometric Study of the Spatial Structure of a Light-Scattering Medium", <u>Journal of Applied Spectroscopy</u> , Vol. 28, pages 518-525, 1978
		Kazovsky, L. G. et al., "Heterodyne Detection Through Rain, Snow, and Turbid Media: Effective Receiver Size at Optical Through Millimeter Wavelengths", <u>Applied Optics</u> , Vol. 22, pages 706-710, March 1983
		Kersey, A. D. et al., "Adaptive Polarization Diversity Receiver Configuration for Coherent Optical Fiber Communications", <u>Electronics Letters</u> , Vol. 25, pages 275-277, February 1989
		Kohlhaas, Andreas et al., "High-Resolution OCDR for Testing Integrated-Optical Waveguides: Dispersion-Corrupted Experimental Data Corrected by a Numerical Algorithm", <u>Journal of Lightwave Technology</u> , Vol. 9, pages 1493-1502, November 1991
		Larkin, Kieran G., "Efficient Nonlinear Algorithm for Envelope Detection in White Light Interferometry", <u>Journal of the Optical Society of America A-Optics Image Science and Vision</u> , Vol. 13, pages 832-843, April 1996
		Leitgeb, R. et al., "Spectral measurement of Absorption by Spectroscopic Frequency-Domain Optical Coherence Tomography", <u>Optics Letters</u> , Vol. 25, pages 820-822, June 2000
		Lexer, F. et al., "Wavelength-Tuning Interferometry of Intraocular Distances", <u>Applied Optics</u> , Vol. 36, pages 6548-6553, September 1997
		Mitsui, Takahisa, "Dynamic Range of Optical Reflectometry with Spectral Interferometry", <u>Japanese Journal of Applied Physics Part 1-Regular Papers Short Notes & Review Papers</u> , Vol. 38, pages 6133-6137, 1999
		Naganuma, Kazunori et al., "Group-Delay Measurement Using the Fourier-Transform of an Interferometric Cross-Correlation Generated by White Light", <u>Optics Letters</u> , Vol. 15, pages 393-395, April 1990
		Okoshi, Takanori, "Polarization-State Control Schemes for Heterodyne or Homodyne Optical Fiber Communications", <u>Journal of Lightwave Technology</u> , Vol. LT-3, pages 1232-1237, December 1995

Examiner

Date Considered

* Examiner: Initial citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449 U.S. Department of Commerce
(REV. 2-82) Patent and Trademark Office

Atty. Docket No.
036290/US/2 – 475387-
00017

Serial No.
10/501,268

**INFORMATION DISCLOSURE STATEMENT
BY APPLICANT**
(Use several sheets if necessary)

Applicant(s)
Guillermo J. Tearney

Filing Date
July 9, 2004

Group
2878

		Passy, R. et al., "Experimental and Theoretical Investigations of Coherent OFDR with Semiconductor-Laser Sources", <u>Journal of Lightwave Technology</u> , Vol. 12, pages 1622-1630, September 1994
		Podoleanu, Adrian G., "Unbalanced Versus Balanced Operation in an Optical Coherence Tomography System", <u>Applied Optics</u> , Vol. 39, pages 173-182, January 2000
		Price, J. H. V. et al., "Tunable, Femtosecond Pulse Source Operating in the Range 1.06-1.33 μ m Based on an Yb ³⁺ -doped Holey Fiber Amplifier", <u>Journal of the Optical Society of America B-Optical Physics</u> , Vol. 19, pages 1286-1294, June 2002
		Schmitt, J. M. et al., "Measurement of Optical-Properties of Biological Tissues By Low-Coherence Reflectometry" <u>Applied Optics</u> , Vol. 32, pages 6032-6042, October 1993
		Silberberg, Y. et al., "Passive-Mode Locking of a Semiconductor Diode-Laser", <u>Optics Letters</u> , Vol. 9, pages 507-509, November 1984
		Smith, L. Montgomery et al., "Absolute Displacement Measurements Using Modulation of the Spectrum of White-Light in a Michelson Interferometer", <u>Applied Optics</u> , Vol. 28, pages 3339-3342, August 1989
		Sonnensc, C. M. et al., "Signal-To-Noise Relationships for Coaxial Systems that Heterodyne Backscatter from Atmosphere", <u>Applied Optics</u> , Vol. 10, pages 1600-1604, July 1971
		Sorin, W. V. et al., "Measurement of Rayleigh Backscattering at 1.55 μ m with 32 μ m Spatial Resolution", <u>IEEE Photonics Technology Letters</u> , Vol. 4, pages 374-376, April 1992
		Sorin, W. V. et al., "A Simple Intensity Noise-Reduction Technique for Optical Low-Coherence Reflectometry", <u>IEEE Photonics Technology Letters</u> , Vol. 4, pages 1404-1406, December 1992
		Swanson, E. A. et al., "High-Speed Optical Coherence Domain Reflectometry", <u>Optics Letters</u> , Vol. 17, pages 151-153, January 1992
		Takada, K. et al., "High-Resolution OFDR with Incorporated Fiberoptic Frequency Encoder", <u>IEEE Photonics Technology Letters</u> , Vol. 4, pages 1069-1072, September 1992

Examiner

Date Considered

* Examiner: Initial citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449 U.S. Department of Commerce
(REV. 2-82) Patent and Trademark Office

Atty. Docket No.
036290/US/2 – 475387-
00017

Serial No.
10/501,268

**INFORMATION DISCLOSURE STATEMENT
BY APPLICANT**
(Use several sheets if necessary)

Applicant(s)
Guillermo J. Tearney

Filing Date
July 9, 2004

Group
2878

			"Narrow-Band light Source with Acoustooptic Tunable Filter for Optical Low-Coherence Reflectometry", by Takada, Kazumasa et al., <u>IEEE Photonics Technology Letters</u> , Vol. 8, pages 658-660, May, 1996
			Takada, Kazumasa et al., "New Measurement System for Fault Location in Optical Wave-Guide Devices Based on an Interometric-Technique", <u>Applied Optics</u> , Vol. 26, pages 1603-1606, May 1987
			Tateda, Mitsuhiro et al., "Interferometric Method for Chromatic Dispersion Measurement in a Single-Mode Optical Fiber", <u>IEEE Journal Of Quantum Electronics</u> , Vol. 17, pages 404-407, March 1981
			Toide, M. et al., "Two-Dimensional Coherent Detection Imaging in Multiple Scattering Media Based the Directional Resolution Capability of the Optical Heterodyne Method", <u>Applied Physics B (Photophysics and Laser Chemistry)</u> , Vol. B52, pages 391-394, 1991
			Trutna, W. R. et al., "Continuously Tuned External-Cavity Semiconductor-Laser", <u>Journal of Lightwave Technology</u> , Vol. 11, pages 1279-1286, August 1993
			Uttam, Deepak et al., "Precision Time Domain Reflectometry in Optical Fiber Systems Using a Frequency Modulated Continuous Wave Ranging Technique", <u>Journal of Lightwave Technology</u> , Vol. 3, pages 971-977, October 1985
			Von Der Weid, J. P. et al., "On the Characterization of Optical Fiber Network Components with Optical Frequency Domain Reflectometry", <u>Journal of Lightwave Technology</u> , Vol. 15, pages 1131-1141, July 1997
			Wysocki, P.F. et al., "Broad-Spectrum, Wavelength-Swept, Erbium-Doped Fiber Laser at 1.55-Mu-M", <u>Optics Letters</u> , Vol. 15, pages 879-881, August 1990
			Youngquist, Robert C. et al., "Optical Coherence-Domain Reflectometry – A New Optical Evaluation Technique", <u>Optics Letters</u> , Vol. 12, pages 158-160, March 1987
			Yun, S. H. et al., "Wavelength-Swept Fiber Laser with Frequency Shifted Feedback and Resonantly Swept Intra-Cavity Acoustooptic Tunable Filter", <u>IEEE Journal of Selected Topics in Quantum Electronics</u> , Vol. 3, pages 1087-1096, August 1997
			Yun, S. H. et al., "Interrogation of Fiber Grating Sensor Arrays with a Wavelength-Swept Fiber Laser", <u>Optics Letters</u> , Vol. 23, pages 843-845, June 1998

Examiner

Date Considered

* Examiner: Initial citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449 U.S. Department of Commerce
(REV. 2-82) Patent and Trademark Office

Atty. Docket No.
036290/US/2 – 475387-
00017

Serial No.
10/501,268

**INFORMATION DISCLOSURE STATEMENT
BY APPLICANT**
(Use several sheets if necessary)

Applicant(s)
Guillermo J. Tearney

Filing Date
July 9, 2004

Group
2878

Yung, K. M., "Phase-Domain Processing of Optical Coherence Tomography Images", Journal of Biomedical Optics, Vol. 4, pages 125-136, January 1999

Zhou, Xiao-Qun et al., "Extended-Range FMCW Reflectometry Using an optical Loop with a Frequency Shifter", IEEE Photonics Technology Letters, Vol. 8, pages 248-250, February 1996

Zorabedian, Paul et al., "Tuning Fidelity of Acoustooptically Controlled External Cavity Semiconductor-Lasers", Journal of Lightwave Technology, Vol. 13, pages 62-66, January 1995

Victor S. Y. Lin et al., "A Porous Silicon-Based Optical Interferometric Biosensor", Science Magazine, Vol. 278, pages 840-843, October 31, 1997

4827-1921-6384\1

Examiner

Date Considered

* Examiner: Initial citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.